

INSIDE

Building a better teeter-totter

by Eric Dieterle, Engineering Communications

FEA: A new optimization tool

Page 3

Iowa waste reduction support programs

Page 5

Performance benchmarking

Page 6

CIRAS partners with IPOC

Page 8

Technology Outreach 2000

Page 11

Glen Hylton looked at a jumble of metal and saw the simple beauty of a teeter-totter. When he decided to market his backyard project, a jumble of engineering questions appeared. Fortunately, CIRAS was able to see him through to a simple answer.

Along the way, engineers at Iowa State University and Ames Laboratory put Hylton's handiwork, known as the Teeter Seater teeter-totter, through an exacting regimen of design analysis and structural tests.

"The skill levels that those engineers have is amazing," said Hylton, who owns Nevada Metalworks. "The biggest question they answered for me was figuring out my load capacities. I didn't know how to change the design and still maintain the structural integrity, and they were able to show me how to do that."

No less amazing was the way CIRAS coordinated all the players in the teeter-totter game. John Van

Engelenhoven, an industrial specialist at the CIRAS regional office in Marshalltown, started the process after hearing from Hylton.

"Glen contacted us because he thought he might want to market the teeter-totter but he hadn't done any design or testing," Van Engelenhoven explained. "My job was to match him up with the appropriate services on campus."

That included bringing in another industrial outreach expert. Paul Berge of the Iowa Companies Assistance Program arranged funding for the tests and lab time that would be needed. ICAP itself is funded through the ISU Institute for Physical Research and Technology.

"We work with CIRAS to give it access to services the university has for its clients," Berge said.

CIRAS Mission Statement

CIRAS' mission is to assist Iowa manufacturing to improve its operational performance. CIRAS will collaborate with the Iowa Manufacturing Extension Partnership program and its partners in fulfilling its mission. CIRAS will employ delivery methods consistent with Iowa State University's outreach efforts. It will engage in education and training programs for its clients to assure that managers and staff of clients are aware of current technical and managerial practices. It wishes to be recognized as the preferred source of unbiased information for the industry.

CIRAS Central Staff

Ames

Richard A. Grieve, PE, CIRAS Director (Interim)
 Industrial and mechanical engineering
 515-294-9592, x1grieve@exnet.iastate.edu

Verl K. Anders, Operations Manager
 CQA, CPIM, Financial and cost management, planning,
 ISO 9000, production control
 515-294-1316, x1vander@exnet.iastate.edu

James R. Black, Strategic planning, Kaizen, constraint management, flow
 manufacturing, JIT, kanban, Deming problem-solving process
 515-294-1507, x1jblack@exnet.iastate.edu

Steve Devlin, product design, CAD/CAM software and solid
 modeling, rapid prototyping technologies
 515-294-5416, x1devlin@exnet.iastate.edu

Don W. Eichner, PE, Computer integrated manufacturing, productivity
 515-294-4449, x1eichnr@exnet.iastate.edu

Jeffrey L. Mohr, EIT, Industrial engineering, manufacturing
 systems modeling, product development
 515-294-8534, x1jmohr@exnet.iastate.edu

Sharmon Norris, Administrative specialist,
 budget administration and support staff supervision
 515-294-5420, x1norris@exnet.iastate.edu

Carey Novak, Industrial liaison specialist
 515-294-2293, cnovak@iastate.edu

John A. Roberts, EIT, Computer aided drafting,
 solid modeling, product development
 515-294-0932, x1robert@exnet.iastate.edu

Chris Thach, personal computer systems support,
 network and Internet technologies
 515-294-7731, x1cthach@exnet.iastate.edu

Joanne Hansson, Carol Smith, and Sarah Terrones, CPS,
 Support staff 515-294-3420

Iowa Procurement Outreach Center

Bruce Coney, Director, advanced manufacturing
 practices, electronic commerce
 515-294-4461, bconey@ciras.iastate.edu

Anita Williams, Extension Program Specialist, computer
 integrated manufacturing, electronic commerce
 515-294-4475, awilliams@ciras.iastate.edu

Kathleen Bryan, Administrative Specialist, electronic data
 interchange, military standards
 515-294-4473, kbryan@ciras.iastate.edu

CIRAS Field Staff

Cedar Falls/Waterloo

Michael R. Willett, General and production management, simulation-
 specializing in job shops
 319-266-3260, x1willet@exnet.iastate.edu

Cedar Rapids

Donald W. Brown, CQE, manufacturing and project engineering
 319-398-1272, x1brown@exnet.iastate.edu

Paul Gormley, Product development ü^d design
 319-377-9839, x1gormle@exnet.iastate.edu

Council Bluffs

Clay Crandall, PE, Product design and development
 712-366-7070, ccrandall@ciras.iastate.edu

Davenport

Steven P. Vanderlinden, Cost and financial management,
 office and business planning, project costing
 319-336-3318 or 800-462-3255, x1svande@exnet.iastate.edu

Des Moines

Timothy T. Sullivan, Customer service, constraint management,
 human resource management
 515-965-9355, x1sully@exnet.iastate.edu

Fort Dodge

Reg Clause, ISO 9000, value-added agriculture
 515-576-0099 or 800-362-2793 both ext. 2730

Marshalltown

John Van Engelenhoven, Project management and
 engineering design and applications
 515-752-7106, ext. 428, x1jve@exnet.iastate.edu

Mason City

Ron Cox, Ph.D., Mechanical engineering, product design, optimization
 515-424-5432, x1rcox@exnet.iastate.edu

Newton

Dorothy K. Lueck, Quality engineering, management training
 515-792-6433, x1dlueck@exnet.iastate.edu

Ottumwa

Iowa State University Extension Office
 515-682-8324 or 800-726-2585

Peosta

Rudy Pruszko, Manufacturing and technology integration, fluid processing
 engineering, and strategic business development
 319-556-5110 or 800-728-7367, ext. 251, x1pruszk@exnet.iastate.edu

Sioux City

Merle Pochop, Management techniques,
 technology transfer, human resources
 712-274-0048, x1pochop@exnet.iastate.edu

Spencer

Denzil W. Stacy, PhD, Ceramics, material science, new business
 712-262-2264, x1stacy@exnet.iastate.edu

FEA: A new optimization tool

by John Roberts, CIRAS

A term familiar to manufacturers, optimization is a continuous endeavor. You optimize the processes used to manufacture products, the paths developed to get them through these processes, and then you work to optimize the market potential of the products.

How much of it should you be doing? That depends on how much you think your competition is doing. In one sense, optimization is what CIRAS is all about: assisting manufacturers to optimize every aspect of their business. And now CIRAS would like to introduce you to another optimization tool, one that can be used to enhance your product directly through design changes.

The tool is finite element analysis (FEA) software. It offers a process that lets you take parts that make up your product, break them into several geometric elements, write simple equations for each element, and then put the elements together to get an accurate solution to a problem. FEA is best used for static linear structural analysis, including thermal effects. Its other applications are in thermal, frequency, and fluid dynamics analysis.

The benefits of finite element analysis include:

- faster development of new products
- reduced costs to develop new products
- more reliable, high quality products
- fewer materials required
- alternative materials examined
- increased product life
- fewer field failures
- increased customer satisfaction

Conducting an FEA allows you to take a component, simulate its potential environment, analyze it, and gain insight into how the component reacts with its surrounding conditions.

In the past, when alternative designs were considered, a prototype was made and tested, the effects analyzed, and design changes made. A second prototype was made, tested, and analyzed again, if necessary. The process continued until all design considerations were met. Although nothing can take the place of physically testing a product, FEA helps you to get closer to that final design with fewer build and test iterations.

CIRAS, with its contacts in the College of Engineering and Ames Lab, can assist you with all your FEA needs, including:

- 1) instructing companies in the FEA process
- 2) developing in-house FEA capabilities
- 3) examining and improving FEA results

Typically, the analysis is done on individual parts to focus on their capabilities or limitations. Occasionally, however, entire assemblies must be analyzed to accurately simulate real-world conditions. Assemblies require much more work and therefore require more time to complete the analysis. For large, complicated assemblies, a kinematic analysis must be conducted first. CIRAS can provide assistance with these needs also.

Most FEA software packages require three input components.

- 1) CAD model – A digital CAD file of the component will be imported into the FEA software. Some components can be analyzed with a 2-D representation but for best results, a 3-D solid model is needed. If the parts are not very complicated, a detailed drawing is enough to create the CAD file.
- 2) Material specifications – For a structural analysis, this typically includes the ultimate tensile and yield strengths and the modulus of elasticity. For thermal analysis, certain thermophysical properties like the thermal conductivity or thermal diffusivity are needed.
- 3) Applied forces and boundary conditions – For structural analysis, this includes the location, direction, and magnitude of the forces along with other physical conditions that restrict the movement of the component.

For the thermal analysis, this includes the temperature distribution and the medium within which these temperatures exist.

If you do not have some or all of these components, CIRAS can also assist you with determining or developing them.

Software packages currently available for demonstration at ISU include:

- ANSYS
- UG SCENARIO
- COSMOS/WORKS/DESIGN STAR
- IDEAS

For more information on FEA, please contact:
John Roberts 515-294-0932, x1robert@exnet.iastate.edu,
Clay Crandall 712-366-7070, ccrandall@ciras.iastate.edu, or
John Van Engelenhoven 515-752-7106, ext. 428,
x1jve@exnet.iastate.edu. 

Two join CIRAS Advisory Council



Mike Goble

At its quarterly meeting in December, the CIRAS Advisory Council discussed important issues dealing with membership, by-laws, and marketing initiatives to expand its mission and effectiveness. Margaret Wilson, chairperson of the advisory council, stressed communication between CIRAS staff/leaders and council members as a key factor in sustaining continued growth and active involvement of Iowa manufacturers.

Members also discussed ways to strengthen and promote ties with CIRAS clients by providing timely feedback to queries and concerns. Wilson stressed that council members are vital links to CIRAS clients and resources, and their expertise should be fully utilized.

Two new members joined the CIRAS Advisory Council this year. Steve Herndon is manager for Top Mount Products in the engineering division of Amana Products, Amana, Iowa. Mike Goble is vice-president for engineering and production at Diamond V Mills in Cedar Rapids. Advisory council members serve a three-year term on the board and provide valuable guidance to CIRAS in its marketing and outreach efforts to area businesses and industry.

Reg Clause joins CIRAS staff



Reg Clause, a 1972 Iowa State graduate, has joined CIRAS as Industrial Specialist, Fort Dodge. His particular areas of expertise are ISO 9000, value-added agriculture, strategic planning, business planning, and marketing.

Clause comes to CIRAS with 28 years of experience in entrepreneurial business. He has been a private consultant to food and agriculture companies, ranging in size from multi-national conglomerates to regional offices. He operates farming and commercial cattle feeding operations by applying marketing and business principles not traditional to agriculture. In the late '70s, he operated a contract machine shop doing lathe, milling machine, and weld fabrication work for both prototypes and production runs. He is a national leader in agriculture and is often called upon to speak before groups on marketing, entrepreneurship, and government policy.

Clause's broad experience and ability to think strategically have placed him on many task forces and think tank groups. He is an advisor to Brenton Banks Inc. and spent three years as an advisor to the Chicago Fed Bank. His marketing experience covers the U.S. and includes many trips to the Pacific Rim, much of Europe, and the Middle East. Clause is a respected writer, bringing extensive experience to the CIRAS team for feasibility studies, marketing plans, business plans, and other such formats. He brings a unique blend of experience ranging across manufacturing, banking, production agriculture, logistics, food processing, marketing, and research.

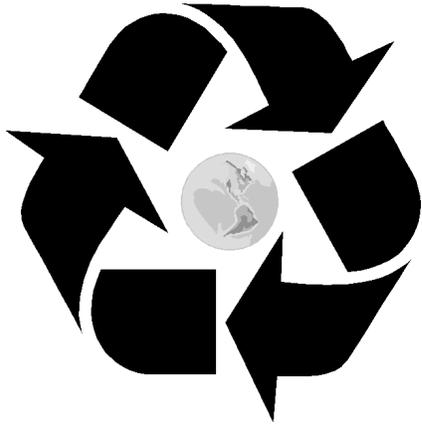
CIRAS News is published quarterly by the Center for Industrial Research and Service and edited by the CIRAS publications team: Jim Black, editor; Joanne Hansson, Patrick Herteen, Jeff Mohr, Pam Reinig, John Roberts, and John Van Engelenhoven. Design and production by Engineering Communications and Marketing, Iowa State University.

Articles may be reprinted with the following credit line: "Reprinted from CIRAS News, [insert date of issue], a publication of Iowa State University's Center for Industrial Research and Service." Please send a copy of the reprint to CIRAS News.

ECM 00410

Iowa waste reduction support programs

By Patti Tornquist, Iowa Waste Exchange and Ron Cox, Ph.D., CIRAS



The three R's—reduce, reuse, and recycle—make sense for Iowa's manufacturers. Reducing waste means reduced expenditures on raw materials, warehousing, and disposal. Redesign of processes to reuse material may mean more up-front costs, but can lead to long-term savings and reduction of disposal fees. Recycling raw materials and packaging can save both material costs and disposal fees. Reduce, reuse, and recycle improves the environment and can lead to increased profits for manufacturers.

There are many services available to Iowa businesses that can assist with waste reduction efforts. Here, we describe a variety of programs that are available to Iowa manufacturers to assist them in reducing the waste stream and finding alternatives to the landfill. In-depth articles on many of these programs will be discussed in future issues.

Iowa Waste Exchange

The Iowa Waste Exchange (IWE) provides Iowa businesses and industry with waste management and business assistance services that result in both economic and environmental benefits, including waste reduction from landfills. Local-area resource specialists help businesses find new uses and new users for industrial by-products. IWE provides a database of available waste material and waste reduction technical assistance. The IWE is administered through the Iowa Department of Economic Development and is free and confidential to Iowa manufacturers. For assistance contact Johanna Woelfel, 515-424-4906, e-mail: johanna.woelfel@ided.state.ia.us, or Jennifer Drenner, 800-422-3109, e-mail: jennifer.drenner@uni.edu, web: www.state.ia.us/dnr/organiza/wmad/iawaste.

Iowa Waste Reduction Center

The Iowa Waste Reduction Center (IWRC) provides waste reduction and pollution prevention assistance and training. They are also a confidential source for assistance with federal and state environmental regulation compliance. IWRC has industry-specific pollution prevention information for printers, auto body shops, dry cleaners, manufacturers with oil waste issues, etc. There is no charge for help with waste issues for Iowa manufacturers with less than 200 employees. IWRC is located on the University of Northern Iowa campus. For assistance contact Jim Olson at 800-422-3109, e-mail: olsonj@uni.edu, web: www.iwrc.org.

Recycle Iowa

Recycle Iowa assists the state, its businesses, and local communities in developing recycling markets through business outreach efforts. They can assist Iowa manufacturers by directing them to resources, completing surveys to see where particular wastes or by-products are located within the state, or provide assistance with market development associated with changing materials in a product or with the development of a new recycling-based product or process. The program is operated by the Iowa Department of Economic Development. For assistance contact David Cretors at 515-242-4940, e-mail: David.Cretors@ided.state.ia.us, web: www.recycleiowa.org.

Recycling & Reuse Technology Transfer Center

The Recycling & Reuse Technology Transfer Center (RRTTC) provides assistance with recycling of waste products through targeted research projects and outreach to the solid waste recycling and reuse community. The RRTTC sponsors applied research projects on new environmental technologies, byproduct utilization, and manufacturing processes affecting municipal and industrial solid waste. RRTTC provides peer-reviewed grants of up to \$25,000 per year for university researchers and students to work on recycling projects that support Iowa companies.

RRTTC also offers a wide range of physical, chemical, and mechanical testing for recycled-content materials through their Material Testing Service. Metallics, a variety of polymers, and cementitious materials can be tested. The

Continued on page 10

Does your company measure up?

by Merle Pochop, CIRAS

Whether it's a grade in school or performance at work, everybody likes to "measure up" but nobody likes to be measured! This is also true for companies, especially small companies. How well does your company stack up when measured against those with whom you compete in the marketplace? Consider:

1. Surveys show that of companies asked to compare, over half believe they are in the top 10% of their industry.
2. Given the dynamics of the market, it is possible to increase sales and profits and still lose ground to competitors.

Your Performance & Rank on 10 Critical Measures & Best Practice

Measure	Your Rank	Your Score	Best Practice
Percent change in sales, past 2 years	27 out of 44	16.9	65.0
Value-added (sales less purchased materials, services, and utilities) per employee	25 out of 43	\$51,000	\$110,955
Training tuition and fees per employee	25 out of 39	\$102	\$933
Percent of employees using a computer or programmable machine controller at least once a week	29 out of 45	33.0	100.0
Number of keyboards and keypads used by shop floor and design/engineering, per employee	3 out of 43	0.667	0.667
Total inventory turns	6 out of 44	19.2	20.2
Percent on-time deliveries to your customers	8 out of 44	97.9	99.0
Percent of lots or jobs expedited by bumping other lots or jobs from schedule	19 of 39	14.3	1.8
Percent of units scrapped	1 out of 43	0.01	0.01
Percent of lots or jobs initially rejected by customers for quality reasons	6 out of 44	0.023	0.010

Figure 1

The first statement is a measure of the tendency to engage in self-delusion. All organizations find ways to promote themselves without basis. In industry, this practice can be dangerous. The second statement is not provable without hard facts or data. Where does one get them?

Today, large industries invest considerable time and effort in the practice of benchmarking. When Ford Motor Co. wanted to improve parts supply performance, they didn't simply look to become better than competitors. Instead, they measured themselves against the best: they went to L.L. Bean, the catalog sales leader in Maine. This is true benchmarking, measuring by

Your Percentile Score on 10 Critical Measures

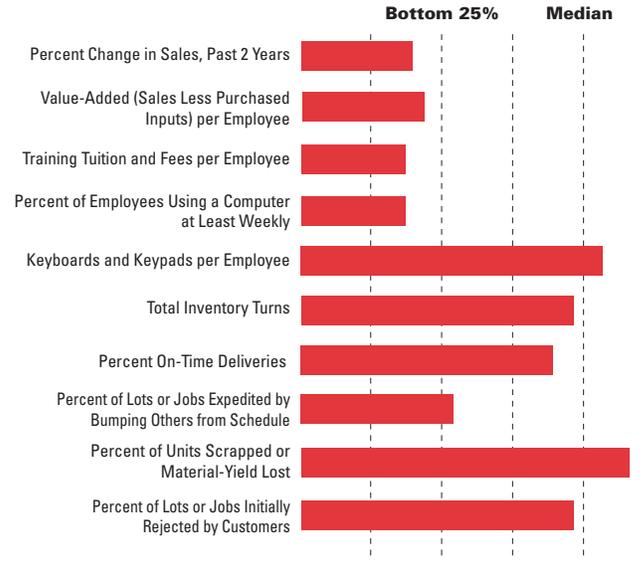


Figure 2

and improving to the best standard available. At the time that Ford did this, in the early '80s, L.L. Bean was a leader in filling orders quickly and accurately.

Some standards are much more important than others. Gateway Computer is focused on a program to match the best in their industry in inventory turns. Dell Computer leads that industry with an inventory turnover of 42 times per year, while Gateway is at 28. The importance of this score is apparent when you consider the effect on sales margin during the recent economic downturn in Asia. Inventory held too long would have to be sold at a lower price than what it cost.

While it is clear that benchmarking has value, the costs to do activities as described above are simply beyond the reach of most smaller companies. But there are effective and economical ways for companies to determine where they stand. CIRAS, through its

Value-Added Per Employee: How Shops Like Yours Perform

Your Rank: 25 out of 43 Responses

Plants in the top 5% have values of at least	\$140,738
Plants in the top 10% have values of at least	\$110,995
Plants in the top 25% have values of at least	\$88,253
Plants in the top half have values of at least	\$57,568
Plants in the bottom 25% have values of at least or below	\$43,285

Your Performance.....\$51,000

Figure 3

Performance benchmarking gives answers

partner, the Iowa Manufacturing Extension Partnership (IMEP) offers computer-aided benchmarking services that can provide management with information to see how they measure up and where to prioritize resources for most effective results.

Performance Benchmarking Services is a software-based tool developed by the Industrial Technology Institute of Michigan. The system is easy for users to apply. A questionnaire, tailored to the Standard Industrial Code (SIC) of the industry, is supplied to company personnel to respond to all areas. A small amount of reference work is required to gather the data needed for adequate response. This normally takes 6-8 total hours to accomplish. Following this, the completed form is sent to central processing and a preliminary report is generated. The report is then scanned by a resident evaluator for incongruities in responses/conclusions. Phone calls or messages are used to clarify any points in question.

When the report, which is confidential, is returned to the requesting company, results are reviewed with an experienced outreach specialist to ensure that findings are understood. The question is now, what do such benchmark exercises find, and what needs to be done?

Figures 1 and 2 show the types of information that a company will typically get as result of having completed the benchmarking questionnaire. The firm is given, by measure taken, its rank, value, and for comparison, the best practice recorded in that category. Because circumstances vary in each company, it is wise to not rely too much on any single measure. Instead, categories of measures should be considered, and evaluated relative to existing market conditions. For example, for workers who must respond quickly to customer changes, the number of input keypads used on the shop floor might be a critical issue. For a firm with a stable product sold to end users, such a measure loses its relative importance.

Figure 3 shows typical value added per employee with a significant spread in value added in terms of dollars from the low end of the industry to the best in that class. It's tempting to ask, "Are those figures real? Is there really that much variance in so simple a measure? A look at returns in Iowa is significant. In just one area of Iowa, value added per employee in a similar industry ranged from a low of \$36,000 to a high of over \$90,000 per employee!

What happens after a performance benchmarking evaluation is completed and returned to the client? Start by examining the overall score, which rates the company relative to similar businesses. Of course, if a firm is on par with or leading in every category, there is no need for change! Typically, though, results will show noticeable areas of lag. In these cases, the firm can pick targets based on resources and time available. The type of change dictates the resources required.

Changes in hard technologies such as machine tools require financial resources and specific training for operators. Changes in soft technology such as quality systems, constraint management, or management practice require changes in attitude by significant numbers of people, especially those at the top. Gaining critical mass to accomplish this takes time. In either case, resources of the company may be committed and this may preclude making other or more choices. In these circumstances performance benchmarking is an invaluable tool to help prioritize tasks. 

JOB SHOP MANAGEMENT

There is still time to register for the Job Shop management series. One tuition payment can cover the training needs of several different employees. For course details, including information about flexible payment options, please contact Mike Willett at 319-266-3260, x1willet@exnet.iastate.edu, or Sarah Terrones at 515-294-5008, x1terron@exnet.iastate.edu.

COURSES INCLUDED IN THE JOB SHOP MANAGEMENT SERIES:

-  **The Strategic Planning and Kaizen Cycle**
May 10, 2000
-  **Managing Human Resources**
June 7, 2000
-  **OSHA Compliance: The Basic Programs**
July 12, 2000
-  **Managing the Purchasing Function of a Firm**
August 9, 2000
-  **Constraint Management: Applying the Theory of Constraints (TOC)**
September 13, 2000
-  **Manufacturing Resource Planning (MRPII)**
October 11, 2000
-  **Financial Accounting for Non-Financial Managers**
November 8, 2000
-  **Cost Accounting and Quoting**
December 6, 2000

CIRAS partners with IPOC

CIRAS welcomes the Iowa Procurement Outreach Center (IPOC) to Iowa State University. In January, IPOC and its staff moved from the Iowa Department of Economic Development in Des Moines to CIRAS in Ames. The move enables IPOC to significantly improve its assistance to their clients in the areas of advanced manufacturing technologies and electronic commerce initiatives.

IPOC is a federally funded program of the ISU Extension Service. It provides marketing and technical assistance to Iowa businesses through proactive outreach. This outreach is targeted at Iowa firms with the potential to provide goods and services to the federal government.

Technical assistance provided by IPOC includes preparation of bids, definitions of technical requirements for specialized products, and assistance with the introduction of commercial products for military and other government specific documents. The office can obtain information on 15 million items regularly purchased by the government.

Marketing assistance includes market research and expansion and retention of market opportunities for firms that are new to government contracting. It also includes expansion and retention of market opportunities for experienced contractors through training and counseling on issues such as electronic commerce, electronic data interchange, and central contractor registration.

IPOC believes that Iowa businesses are in a unique position to capitalize on government and commercial contracting opportunities. With IPOC to transfer the technology to them, these firms will have a globally competitive base of suppliers throughout the state.

The staff:



Bruce Coney,
Director

Coney spent 16 years aiding firms that conduct business with federal agencies and large corporations. He began this line of work in Washington, D.C. with Sales Associates, a company that helps firms with new products identify

potential markets with the government. Many of these firms were original equipment manufacturers from the Midwest.

In 1988, he returned to the Midwest to conduct a similar service in the Quad Cities area. During this time, he became aware of the IPOC Program and joined the Cedar Rapids staff in 1989.

In 1994, Coney became the active director of IPOC and began working on a project with Rockwell Collins and five small suppliers in Iowa. In 1999, IPOC became a Best Manufacturing Practice Satellite Center. Coney is now involved with implementing advanced manufacturing practices and electronic commerce with manufacturing and non-manufacturing firms in Iowa.

You can contact Bruce at 515-294-4461, e-mail bconey@ciras.iastate.edu



Anita Williams,
Extension Program Specialist

Williams started her career at IPOC in 1997 assisting in the exchange of CAD data in electronic format. She currently leads searches in *Commerce Business Daily* on the Small Business Administration (SBA) website and through the General

Service Agency's electronic posting system to locate government solicitations that companies may place bids on. She also trains companies in electronic commerce, helping them become more competitive in the technology.

Williams earned a B.S. degree in computer integrated manufacturing at Purdue University in 1994. Following graduation, she continued to work with the Electronic Manufacturing Productivity Facility in Indianapolis, emphasizing electronics and project work for the Naval Center of Excellence Research Center.

Anita can be reached at 515-294-4475, e-mail: awilliams@ciras.iastate.edu



Kathy Bryan,
Administrative Specialist

Bryan has been at IPOC since its move from Cedar Rapids in 1994. She is the primary contact for new clients, those who need technical assistance and counseling, and also clients seeking information on Military Standards or

Department of Defense Adopted Industry Standards as well as past pricing on items purchased by the government.

She has a background as an administrative specialist with Economy Forms in Des Moines. She received an associate of science and legal assistant degree and continued to work for Economy Forms with the added responsibilities of legal assistant before becoming interested in the challenges that IPOC offered. To contact Kathy call 515-294-4473 or e-mail kbryan@ciras.iastate.edu.

Building a better teeter-totter

Continued from page 1

The nuts and bolts work, so to speak, became the responsibility of Terry Herrman and Mike Harper in Ames Lab's Engineering Services Group.

"CIRAS asked us to look at loading characteristics and model them, then perform a finite element analysis on the beam structure," Herrman said.

Harper modeled the teeter-totter with a 3-D computer software program so he could evaluate stress points as part of a static analysis. His goal was to make sure the device met guidelines established by the American Society for Testing and Materials.

After all the numbers were crunched, Doug Wood of ISU Engineering Research joined the team. He tested the teeter-totter stand, arms, and other components in his structural engineering lab, which is part of the civil and construction engineering program.

"Basically, we performed ultimate-load tests," Wood said. "We loaded the parts up until they failed in order to find out where and at what load the failure occurred."

Hylton, meanwhile, had only to sit back and wait for the answer to his original question. Once he got it, he made the necessary design changes and began to market the teeter-totter. He's spoken with several local retailers and has already sold a couple of units himself. 

I work for Iowa State University College of Engineering's Center for Industrial Research and Service (CIRAS). CIRAS' mission is to assist Iowa manufacturing to improve its operational performance. I am part of University Extension and work with manufacturers throughout the state.

Before joining CIRAS, I worked for 22 years for material handling equipment manufacturers, as an engineer, project engineer, project manager, and chief engineer. My educational background is in civil and structural engineering.

Areas in which I provide direct assistance to manufacturers are material handling, product design, product development, product testing, product standards, welding, plant layout and simulation, engineering management, and project management. I can also provide on-site assessment and explain the broad range of services provided by CIRAS, Iowa State, and its partners.

CIRAS provides a broad range of services to manufacturers in information technology, management practices, simulations, product design and development, and quality and process improvement. Please give me a call at 515-752-7106, ext. 428 to set up an appointment, even if you do not have a need at this time. I would enjoy meeting with you and finding out more about you and your business. A visit to Iowa State and the Ames Lab can also be arranged at any time.

- John Van Engelenhoven, CIRAS

Start your day the IPOC way

IPOC hosts a monthly networking breakfast. This event provides an opportunity to:

- meet one-on-one with federal, state, city, local, and private sector purchasing agents
- increase sales
- network with other entrepreneurs
- identify new clients
- market your business

All minority, women, and small business owners are invited to attend.

The next breakfast will be May 11th in Des Moines. The other scheduled breakfasts are listed on the calendar on page 12. For more information or to make a reservation to attend the breakfast, call Kathy Bryan at 1-515-294-4473 or email kbryan@ciras.iastate.edu.

Don Brown honored



Don Brown, CIRAS Industrial Specialist in Cedar Rapids, received the Regents Award for Staff Excellence from the Iowa Board of Regents October 20, 1999, in Iowa City. The award is presented to professional and scientific employees who have made outstanding professional contributions to Iowa State University, the public, and community.

Brown has been with CIRAS in the Cedar Rapids area since 1988. His areas of expertise include productivity, quality systems, and industrial marketing.

New field specialist joins CIRAS



Clay Crandall, PE, has joined CIRAS as the new field specialist for southwest Iowa. Crandall, who has an undergraduate and master's degree in mechanical engineering from the South Dakota School of Mines, has over 16 years experience in mechanical design, product development, and support. He is a registered professional engineer.

Crandall, who joins the ISU Outreach Center's Council Bluffs office, worked previously at the Boeing Military Airplane Company as a hydraulic/pneumatic systems engineer, at Protec/Pioneer as a project engineer, and at the piston pump division of Vickers as a production momentum engineer.

Crandall brings with him a wide range of experience in design, development, and startup of aggregate processing plants; design and development of pneumatic components and systems; and production support in equipment and manufacturing.

Crandall and his wife have lived in Council Bluffs for three years. His hobbies include biking, motorcycling, and cars.

Iowa waste reduction

Continued from page 5

program is supported by funding from RRTTC and Recycle Iowa. Businesses are charged one-third of the cost of the tests. For information contact Catherine Zeman, Ph.D. at 319-273-7090, e-mail: Catherine.Zeman@uni.edu, web:www.rrttc.uni.edu.

Waste Reduction Assistance Program

The Waste Reduction Assistance Program (WRAP) provides free, non-regulatory assistance to Iowa business, industry, and institutions to reduce waste. After a WRAP team is formed, an on-site audit of waste, recycling, and energy practices is performed and solutions are suggested. WRAP works with industries of 100 or more employees or those classified as Resource Conservation and Recovery Act (RCRA) large quantity generators. The Iowa Department of Natural Resources runs the program. For assistance contact Denise Rayborn at 515-281-8499, e-mail: denise.rayborn@dnr.state.ia.us, web:www.state.ia.us/dnr/organiza/wmad/pollution/wrap.

WasteWise

WasteWise is a free service to help companies design an in-house program for waste prevention, recyclables collection, and the purchase or manufacture of recycled products. Companies must commit to a three-year process of implementing or expanding a solid waste reduction program in their workplace. Programs typically involve set-up of a waste reduction team, waste audits, establishing goals, and tracking progress. WasteWise, operated by the Environmental Protection Agency, provides the program format, a helpline, and a resource library. For assistance contact David Flora at 913-551-7523, web:www.epa.gov/wastewise.

Assistance with waste reduction or conservation issues may be addressed to the contact associated with the most appropriate program. Tornquist may be reached at North Iowa Area Community College at 515-422-4352 or at tornqpat@niacc.cc.ia.us. Issues associated with product design to reduce waste may be addressed to Cox, located at the North-Central Area ISU Outreach Center on the NIACC campus at 515-424-5432 or at rc Cox@iastate.edu. ■

Name

Company Name

Street Address

City, State, Zip

Phone Number FAX Number

E-Mail Address

Special Needs

Check (Payable to Iowa State University) VISA MasterCard Discover

Card Number Expiration Date

Signature

Forms received without payment **WILL NOT** be processed. You will receive acknowledgement of your registration. Return completed form to:

Technology Outreach 2000
June 22-23, 2000

Extended and Continuing Education
c/o Karen Larrew
Iowa State University
102 Scheman Building
Ames, IA 50011-1112

Technology Outreach 2000

June 22-23, 2000

www.eng.iastate.edu/techoutreach

There are several reasons why Iowa technical leaders like you should attend Technology Outreach 2000. You can:

LEARN how to access Iowa State University's technologies and outreach services - access that can lead to solutions to your business' challenging technical problems. In some cases this access is provided at no cost, a definite added benefit.

HEAR how access to ISU's technologies and outreach services has helped businesses just like yours. ISU researchers will present case studies of technical problems solved through services of Iowa State.

SEE ISU's newest technology development tool, the C6, a virtual reality environment that surrounds users on all sides with 3-D imagery and sound.

GAIN first-hand insights from top Iowa leaders about statewide efforts to create business development in areas such as biotechnology, value-added agriculture, advanced manufacturing and information technology.

If your business requires innovative solutions to complicated technical challenges, you won't want to miss Technology Outreach 2000.

For questions about registration, call Karen Larrew at 515-294-6229.

For questions about Technology Outreach 2000 program content, contact Joanne Hansson at <x1jhanss@exnet.iastate.edu> or at 515-294-5382.

Or visit our website at www.eng.iastate.edu/techoutreach

INSIDE

FEA: A new optimization tool	Page 3
Waste reduction support programs	Page 5
Performance benchmarking	Page 6
CIRAS partners with IPOC	Page 8
Technology Outreach 2000	Page 11



CALENDAR

May 3, 2000: Minority and Woman Business Expo and Conference
"Iowa Small Businesses: Leaders in the New Millennium". This conference will be at the Polk County Convention Complex in Des Moines. This conference provides an excellent opportunity for corporate executives, buyers, and decision-makers to find new sources of suppliers and to meet new customers of their products and services. Cost: \$90. For registration information please contact Sue Gibbons, 1-800-362-2127, Ext. 6407.

May 10, 2000: One day workshop "The Strategic Planning and Kaizen Cycle" by Jim Black
This is part of the Job Shop Management series, a slate of nine courses designed to assist job shops with improving performance and profitability. Cost for the entire series of nine courses is \$2,000. This course may be taken individually for \$399 each. For course details, including information about flexible payment options, please contact Mike Willett at 319-266-3260, x1willett@exnet.iastate.edu or Sarah Terrones at 515-294-5008, x1tallon@exnet.iastate.edu.

May 11, 2000: Des Moines Women/Minority/Small Business Owners Networking Breakfast
Downtown Holiday Inn, Des Moines. Cost \$8.00. Register with Kathy Bryan, 800-458-4465, or email kbryan@ciras.iastate.edu

May 18-19, 2000: Workshops for Small Business Innovation Research Program (SBIR) and Small Business Technology Transfer Program (STTR)
These information sessions consist of a workshop and a conference to help attendees learn what it takes to compete successfully for SBIR/STTR awards. Interested parties may attend one or both. The first day program will be held at ISU's Scheman building and the second day will be at ISU's Howe Hall. Both events will be broadcast via the ICN to locations in Cedar Falls, Cedar Rapids, Sioux City, Iowa City and West Des Moines. These seminars are free but registration is required and space is limited. To register and obtain off-site locations, please contact Cheryl Kamman (515)294-9938 or email kamman@iastate.edu.

June 7, 2000: One-day workshop "Managing Human Resources" by Del Shepard
This is part of the Job Shop Management series, a slate of nine courses designed to assist job shops with improving performance and profitability. Cost for the entire series of nine courses is \$2,000. This course may be taken individually for \$399 each. For course details, including information about flexible payment options, please contact Mike Willett at 319-266-3260, x1willett@exnet.iastate.edu or Sarah Terrones at 515-294-5008, x1tallon@exnet.iastate.edu.

June 22-23, 2000: Technology Outreach 2000 Conference.
Two-day conference highlighting Iowa State's technology outreach services and how to access them. All businesses and manufacturers in Iowa are invited to attend. Registration \$25 in advance, \$35 at the door. For program information contact Joanne Hansson at 515-294-5392, x1jhansson@exnet.iastate.edu. For registration information contact Karen Larrew at 515-294-6223.